

Figure 1 A

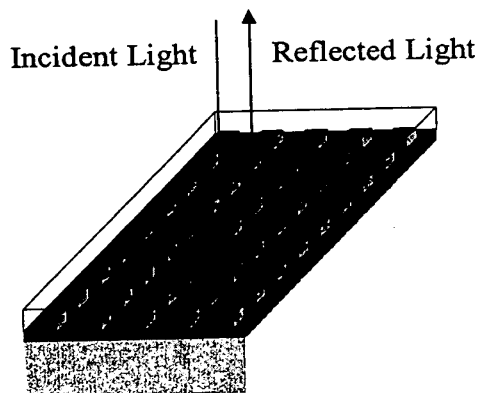
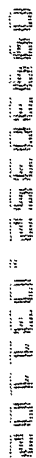


Figure 1 B



4



3/52

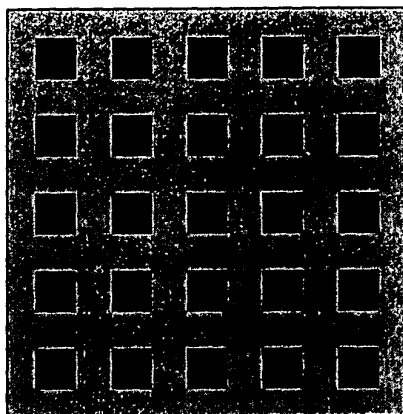


Figure 3A

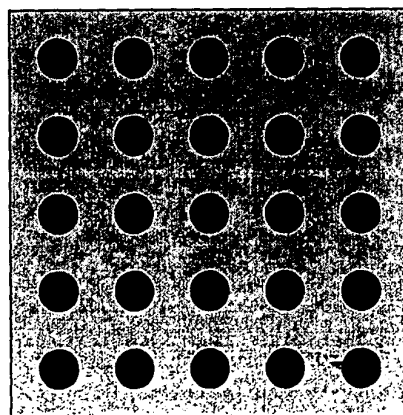


Figure 3B

2011-01-25 08:56:00



4/52

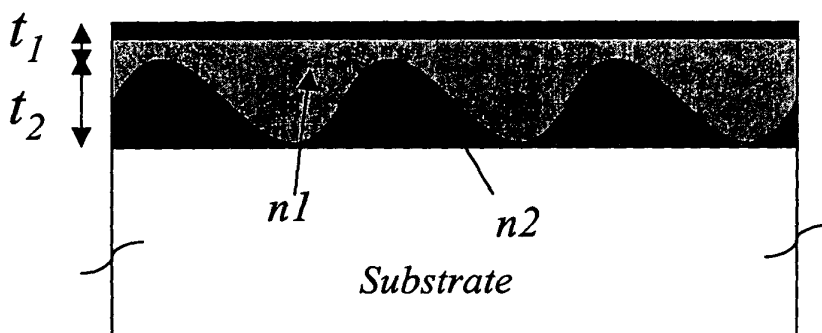


Figure 4



5/52

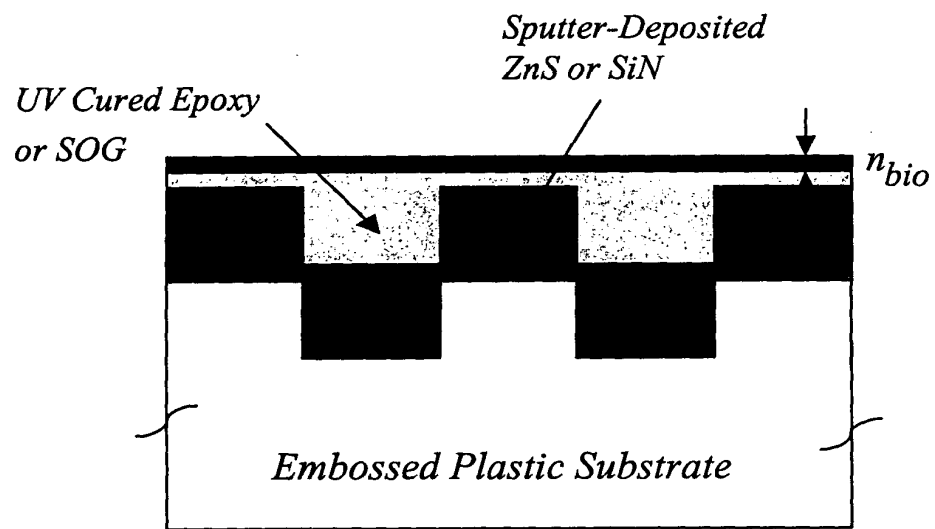


Figure 5



009035-0440  
2011-05-25 09:56:50

### Amine

- Sulfo-succinimidyl-6-(biotinamido)hexanoate (Sulfo-NHS-LC-Biotin)
  - Streptavidin / avidin then biotinylated molecule
- N,N'-disuccinimidyl carbonate (DSC); • -NH<sub>2</sub>, non-cleavable
- Dimethyl pimelimidate (DMP); • -NH<sub>2</sub>, non-cleavable
- Dimethyl 3,3'-dithiobispropionimide (DTBP); • -NH<sub>2</sub>, cleavable
- 1-Ethyl-3-(3-Dimethylaminopropyl)carbodiimide Hydrochloride (EDC) and N-Hydroxysulfosuccinimide (Sulfo-NHS); • -COOH
- Sulfo-succinimidyl 6-[α-methyl-α-(2-pyridyl-dithio)toluamido] hexanoate (Sulfo-LC-SMPT); • -SH, cleavable
- N-(B-Maleimidopropoxy)succinimide ester (BMPS)
  - -SH<sub>2</sub>, non-cleavable
- Sulfo-succinimidyl 4-[N-maleimidomethyl]cyclohexane-1-carboxylate (Sulfo-SMCC); • -SH, non-cleavable

### Aldehyde

- Directly with aldehyde or first amino then aldehyde
  - -NH<sub>2</sub>

### Ni(II)

- Using Nitrilotriacetic acid (NTA) group, which forms a chelate with Ni(II)
  - His-tagged molecules

Figure 6

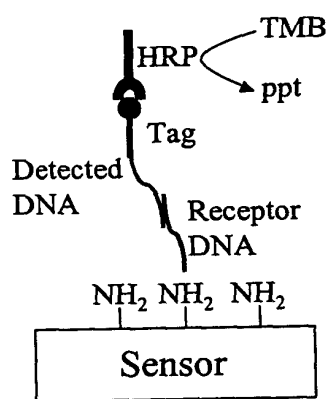


Figure 7A

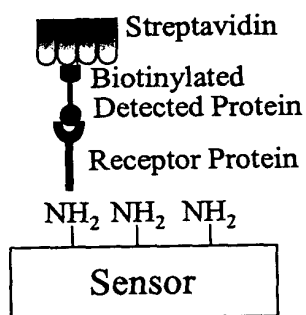


Figure 7B

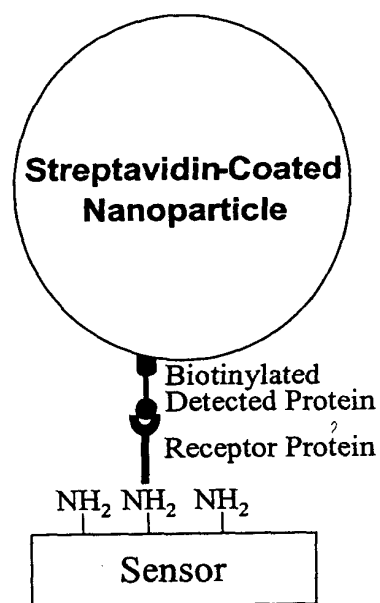


Figure 7C

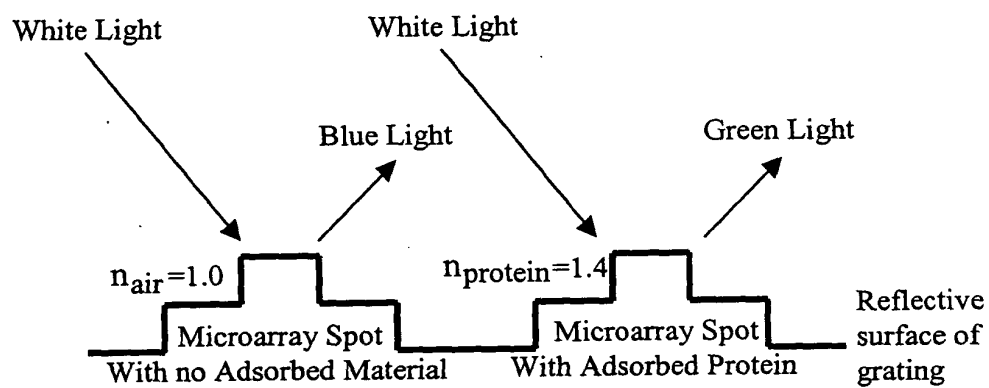


Figure 8

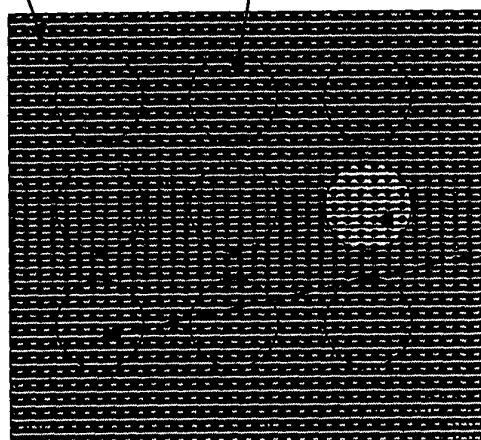




9/52

Grating structure

Microarray location  
without affinity-adsorbed  
molecules



Microarray  
locations with  
affinity-adsorbed  
molecules

Figure 9

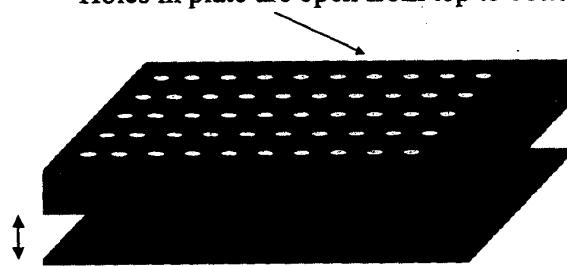


10/52

□ Microtiter plate

□ Microarray slide

Plastic bottomless microtiter plate.  
Holes in plate are open from top to bottom



Resonant reflection biosensor surface

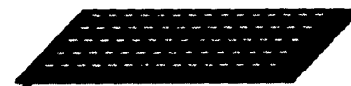


Figure 10A

Figure 10B



• Dip into 96-well plate  
 • Perform 4800 assays

- Dip into 96-well plate
- Perform 4800 assays

Figure 11

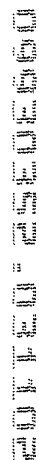
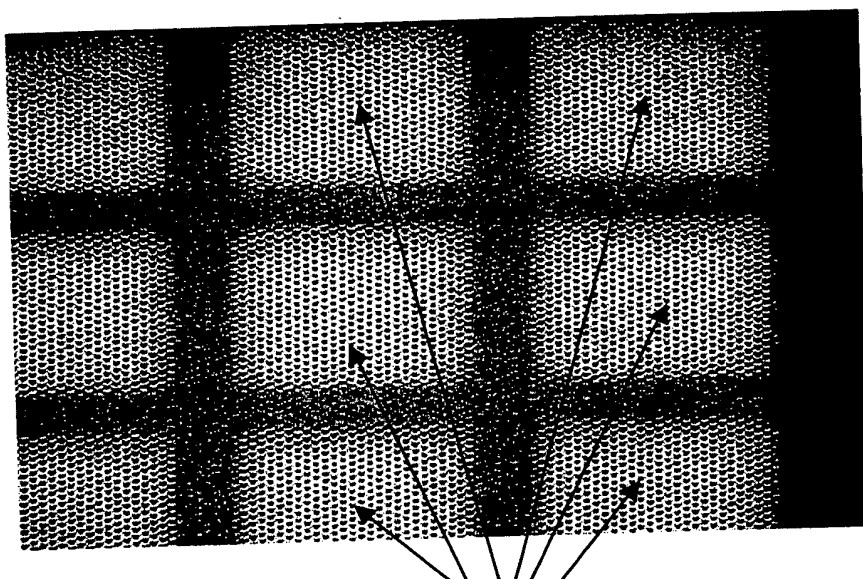


Figure 12



13/52



Separate electrode grating regions

Figure 13

00930352-034402



14/52

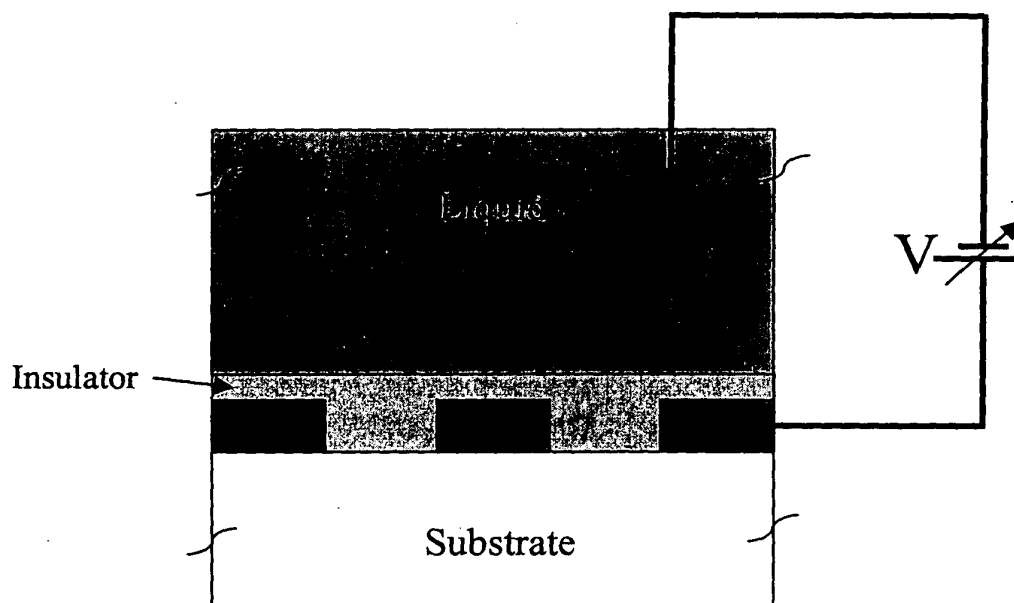


Figure 14

201100 25000000



15/52

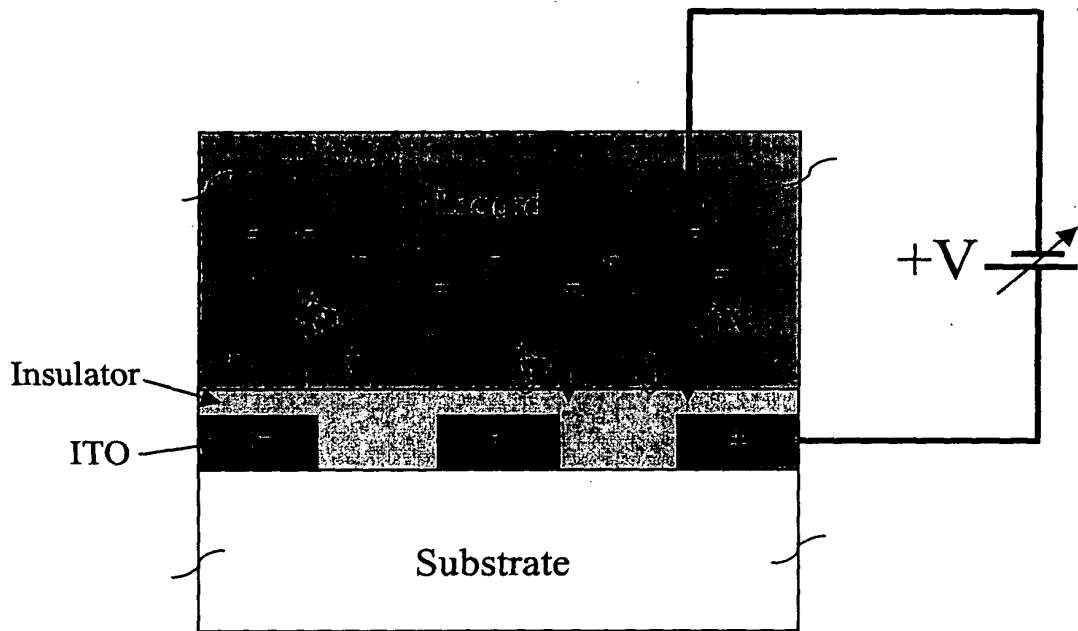


Figure 15



16/52

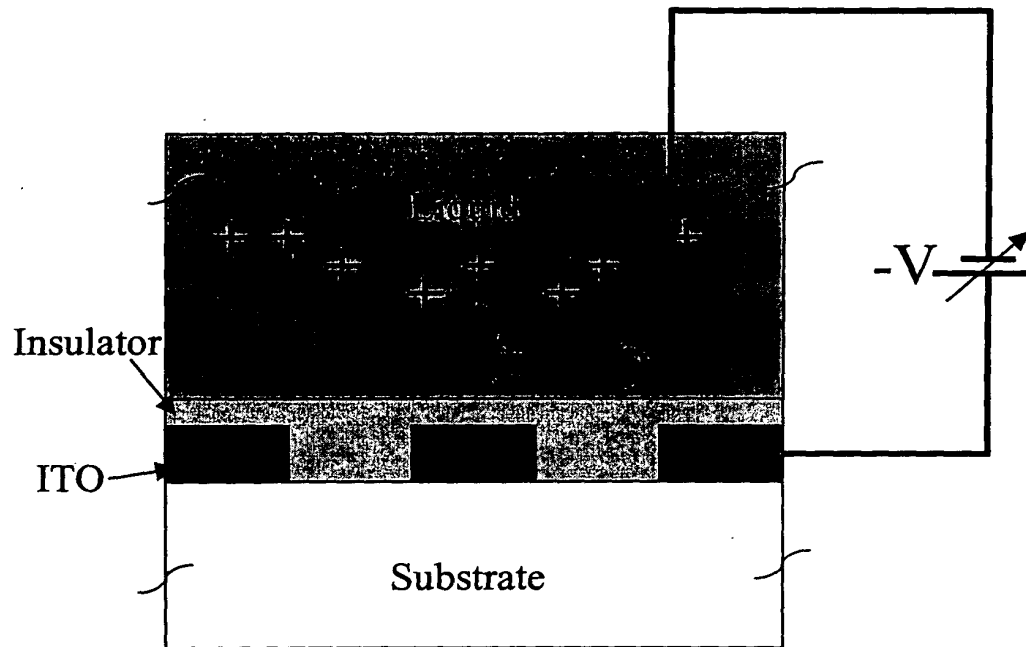


Figure 16

0930352-034102



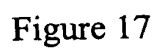
[illegible]

Figure 17

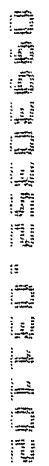


Figure 18



19/52

### Peak Wavelength

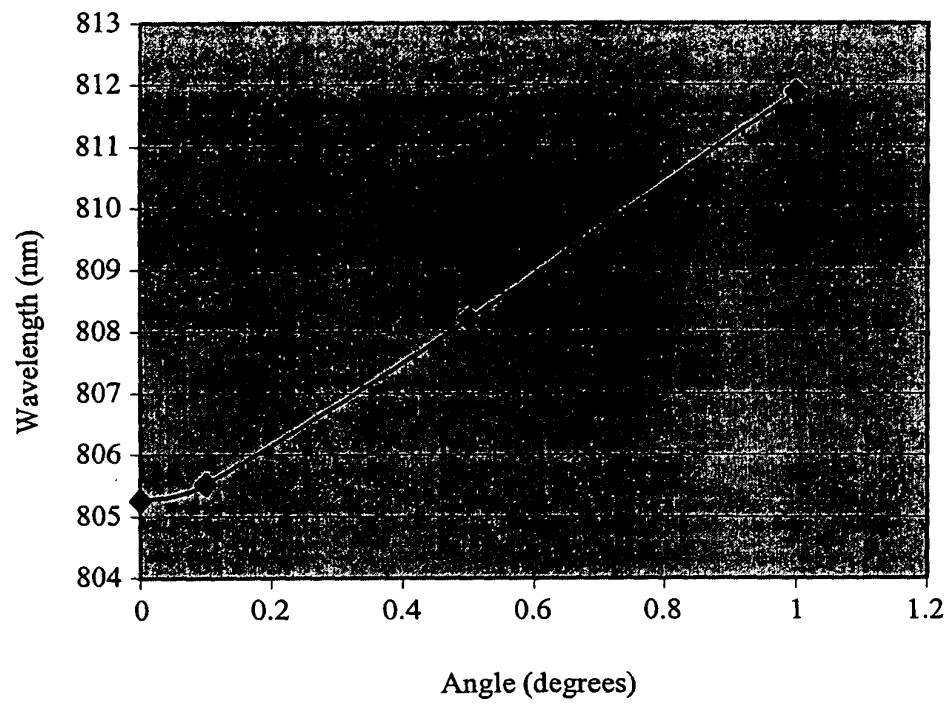


Figure 19

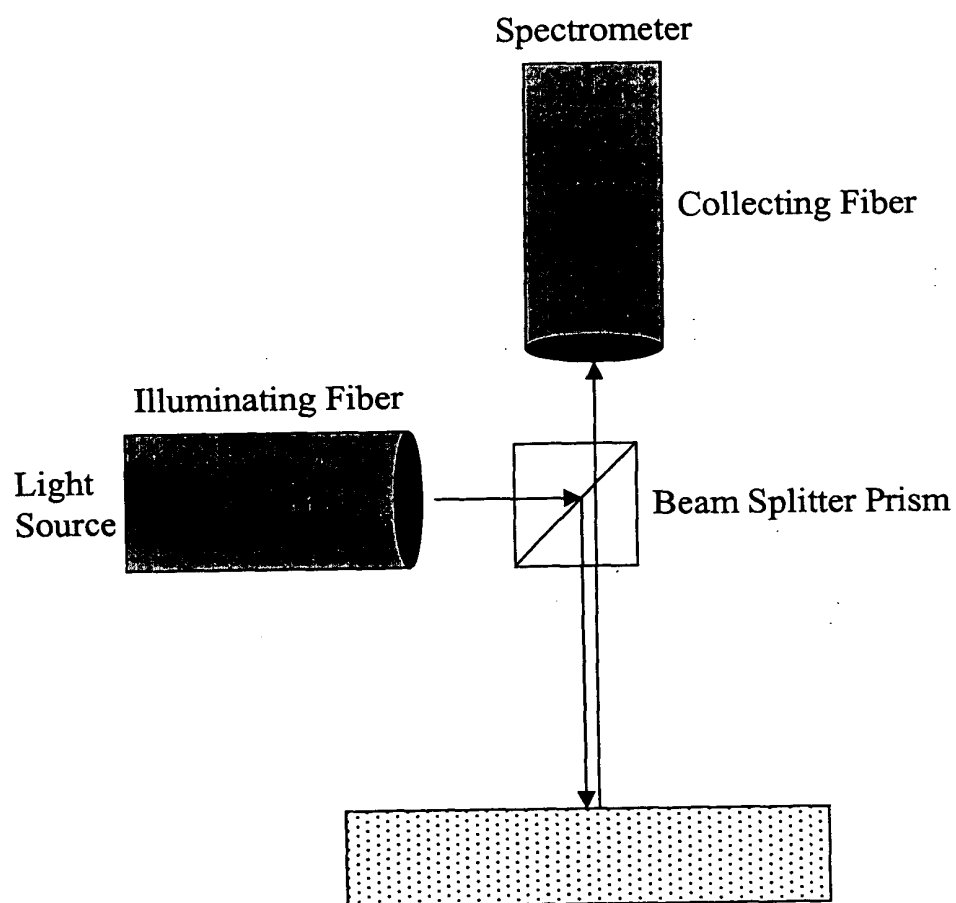


Figure 20

009303E2-03403





21/52

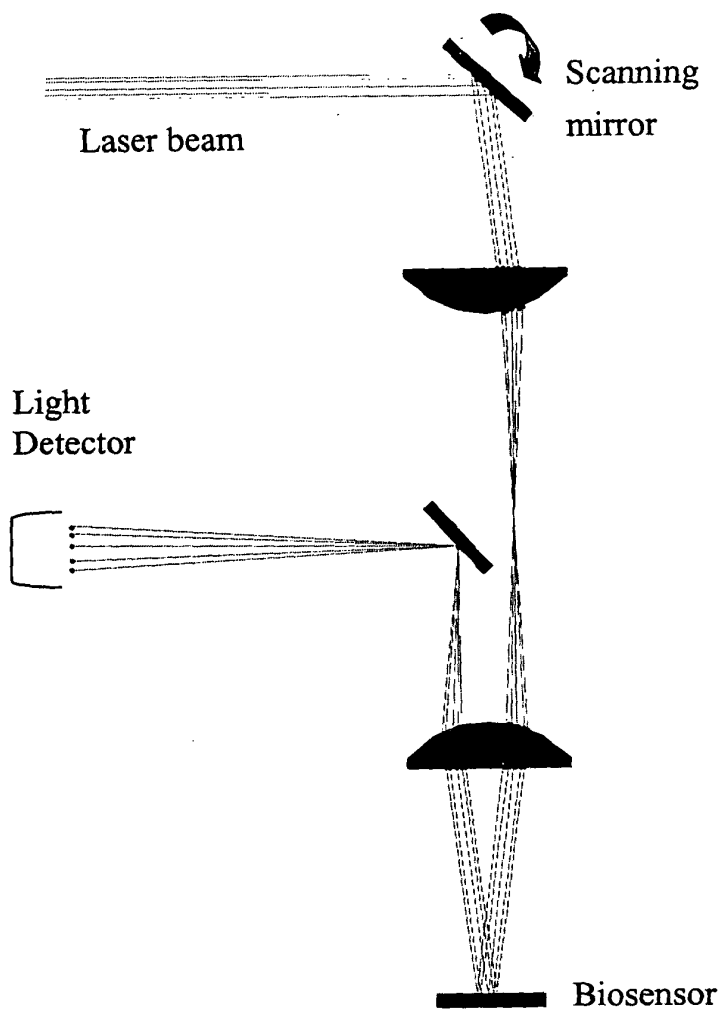


Figure 21

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22/52

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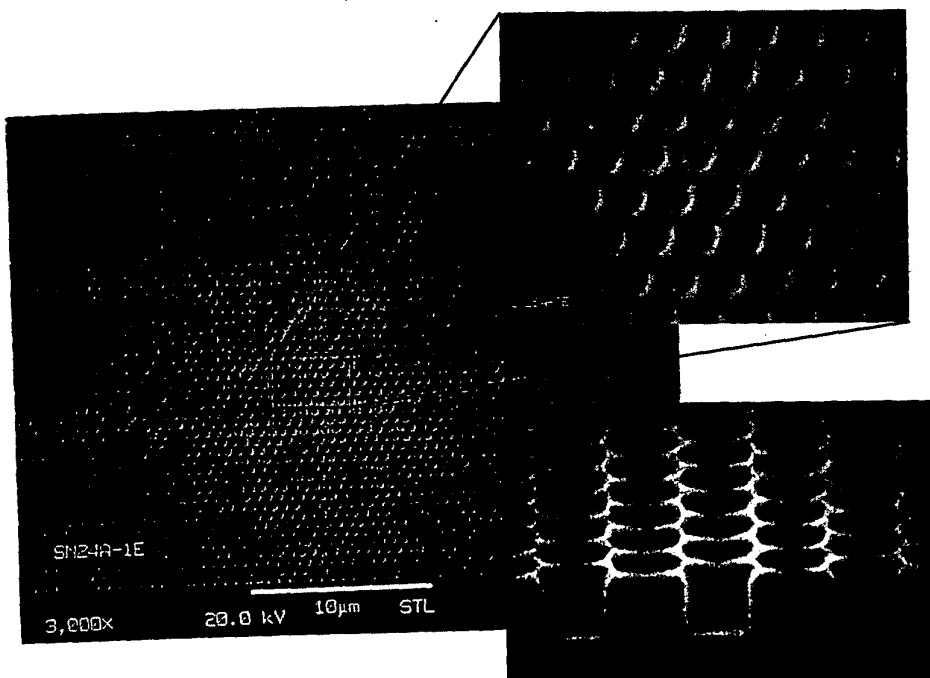


Figure 22





24/52

00930355-034402

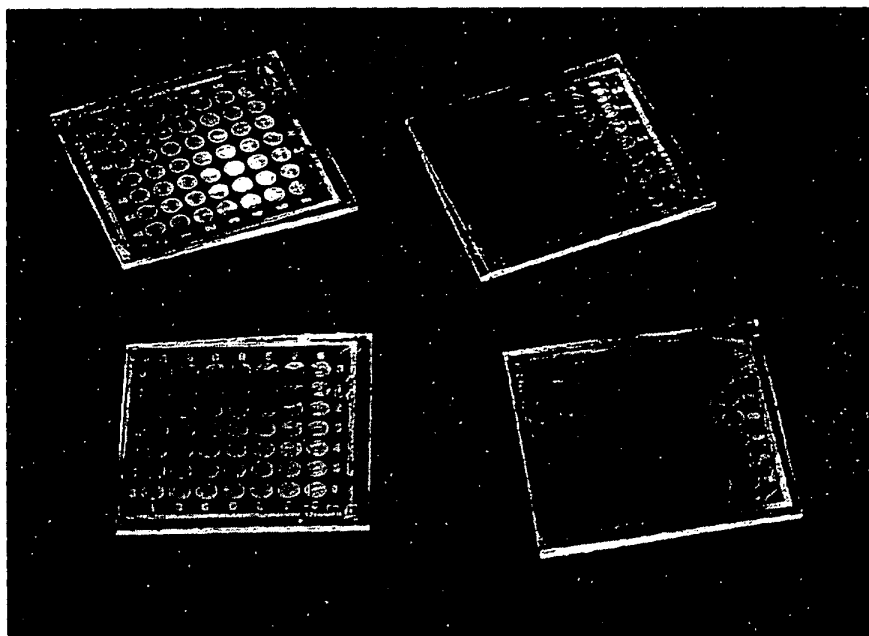


Figure 24





25/52

### Albumin Deposition on Resonant Reflector

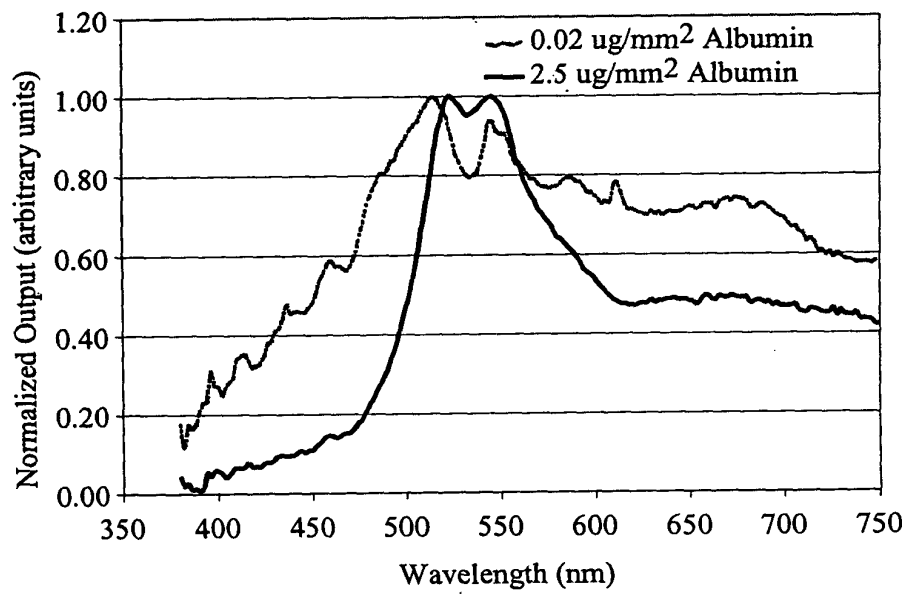


Figure 25



## Resonant Reflector Measured in Water

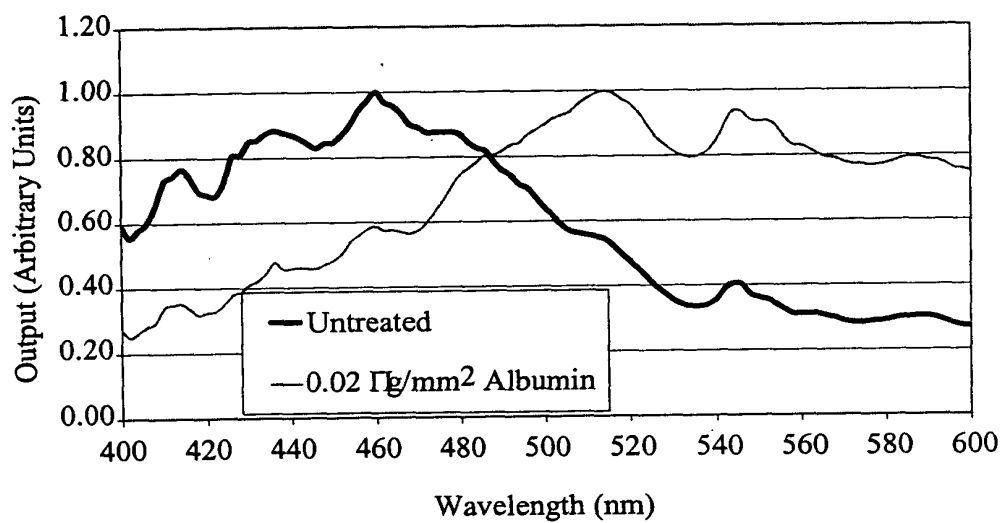
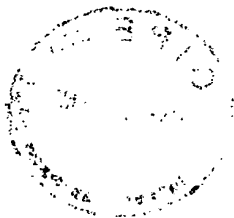


Figure 26



27/52

### Bacteria immobilization on structure

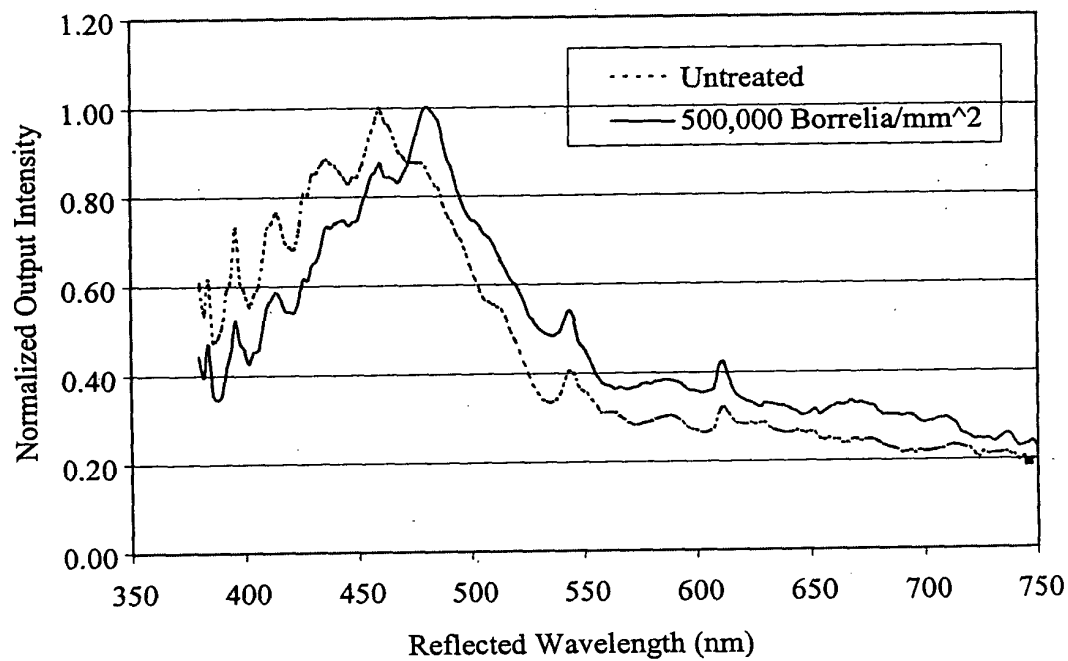


Figure 27



28/52

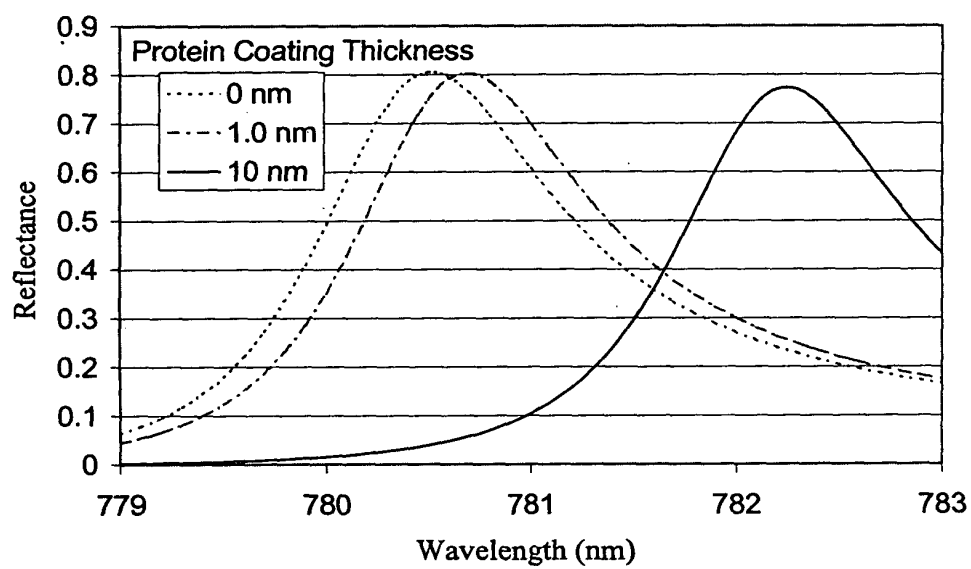


Figure 28

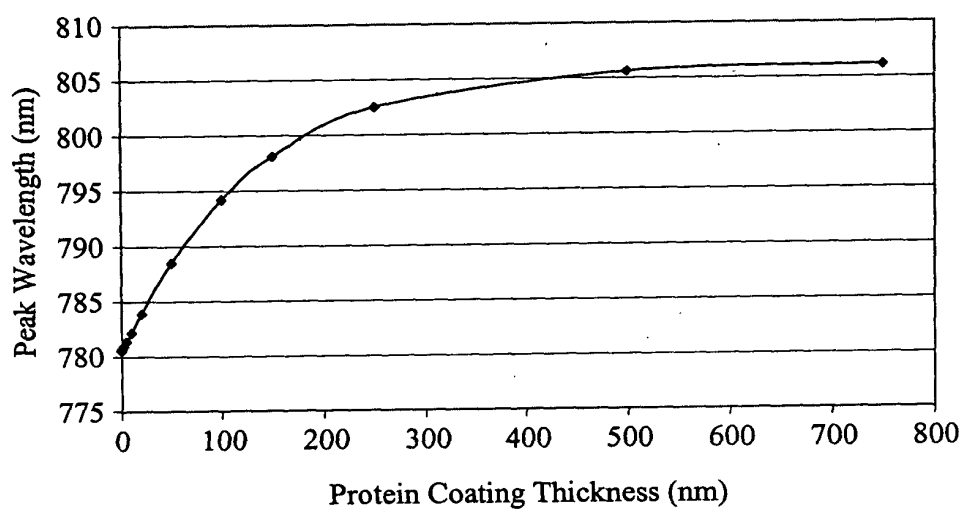
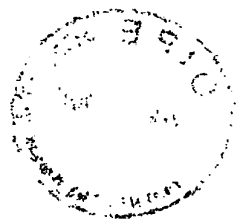


Figure 29



30/52

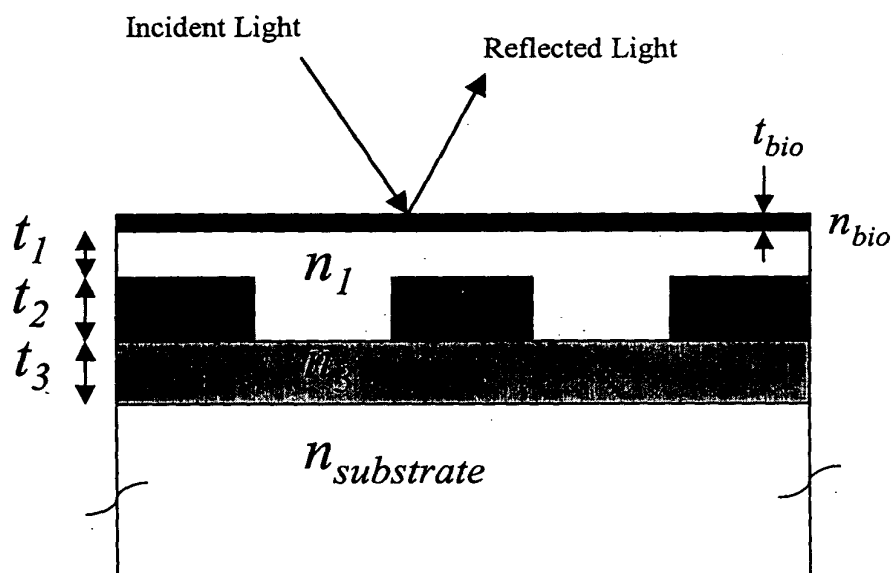


Figure 30



31/52

### Reflected Resonance with Deposited Protein

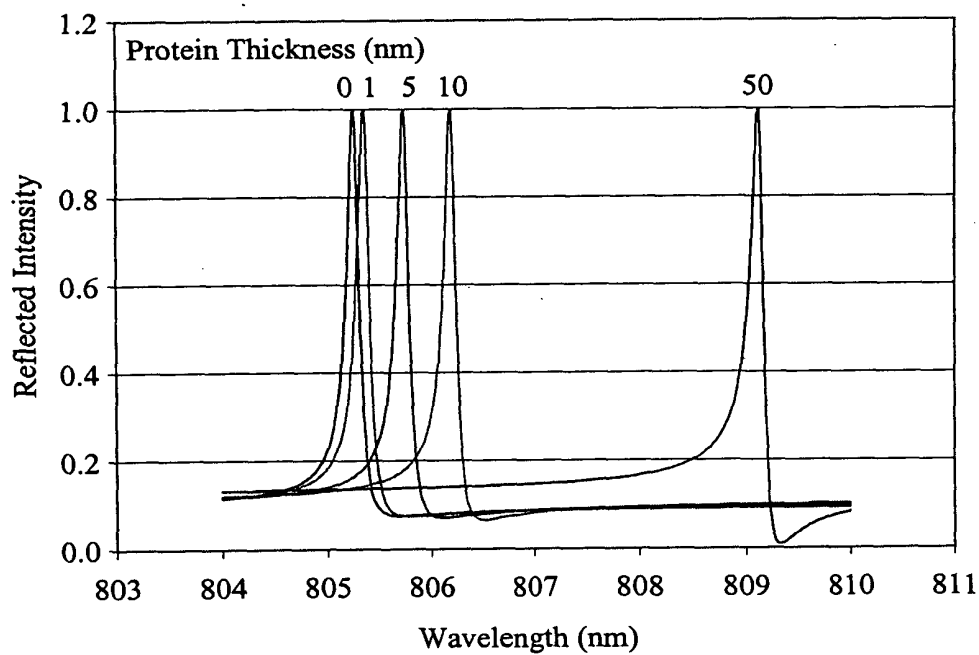


Figure 31



32/52

### Resonant Peak Wavelength Dependence on Deposited Protein Thickness

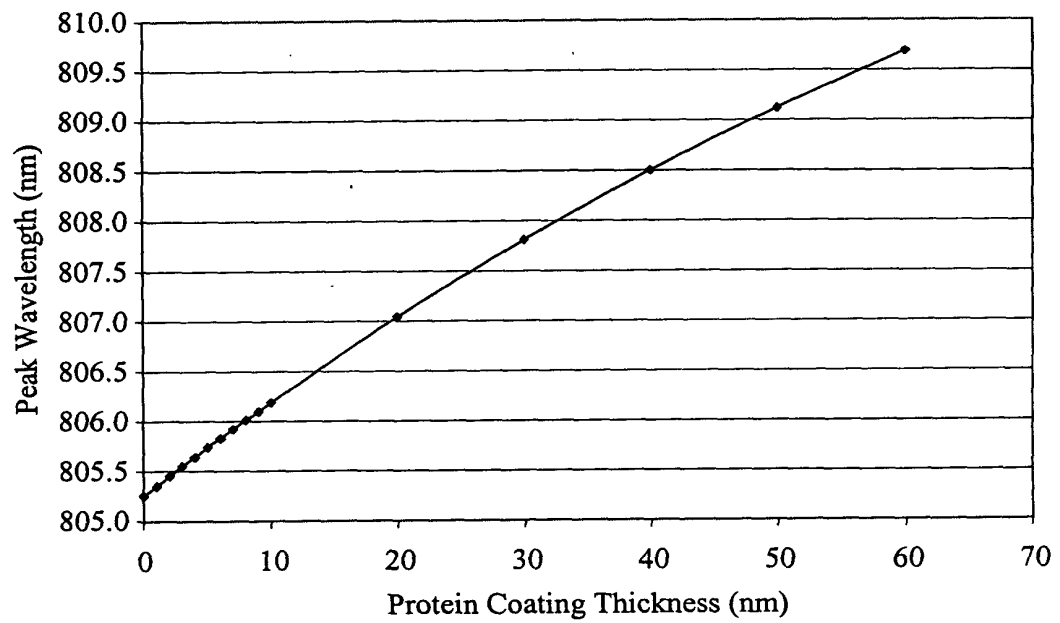


Figure 32





33/52

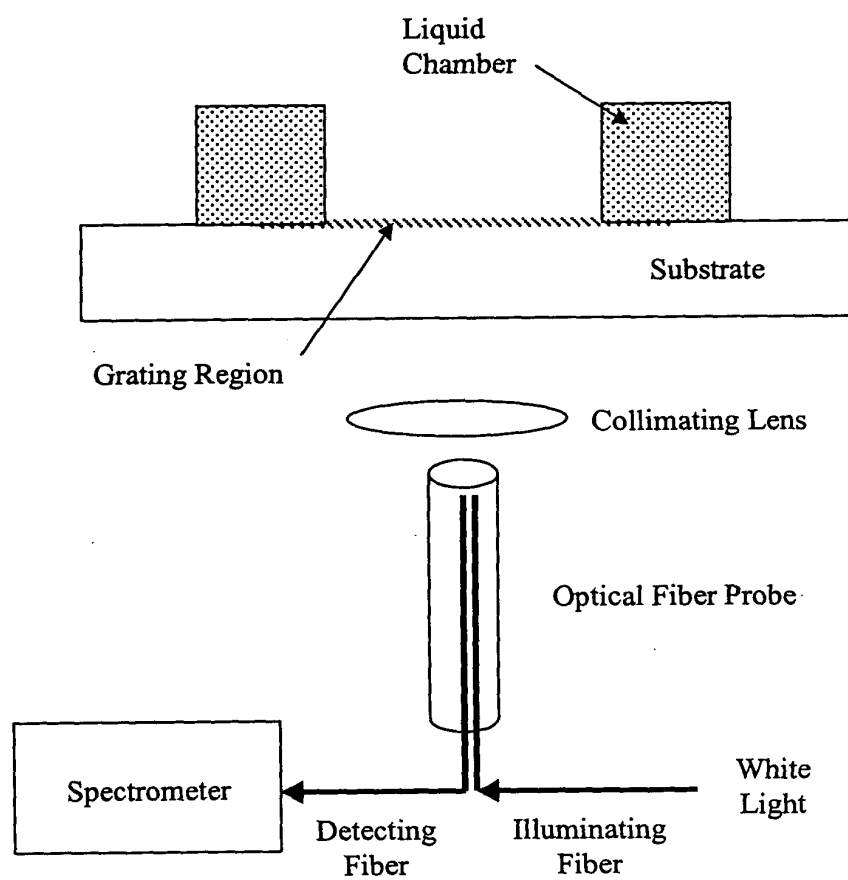


Figure 33



34/52

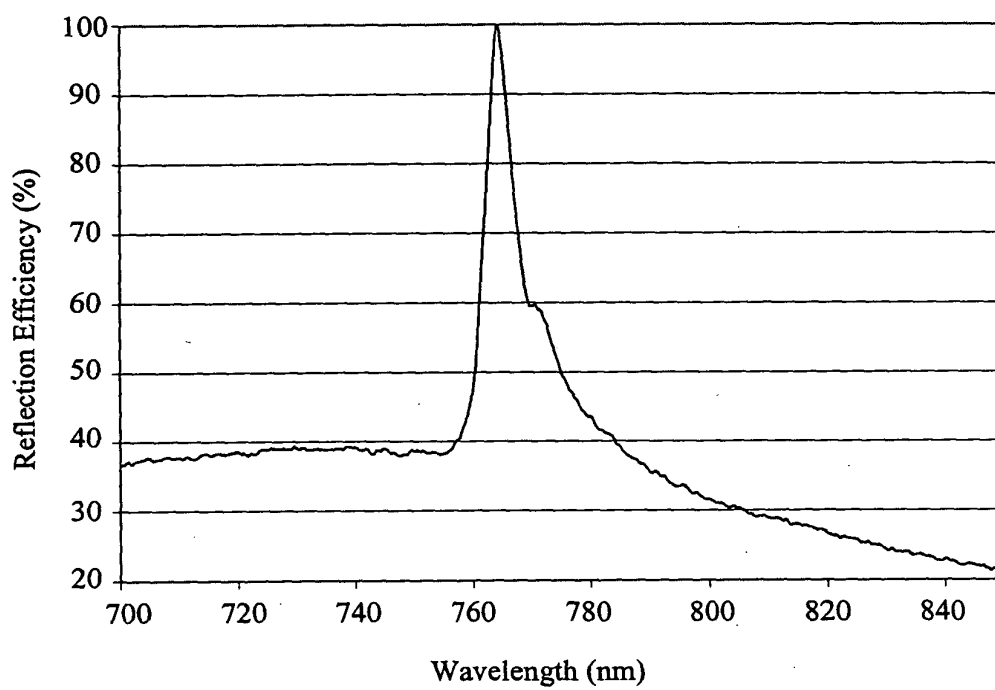


Figure 34



35/52

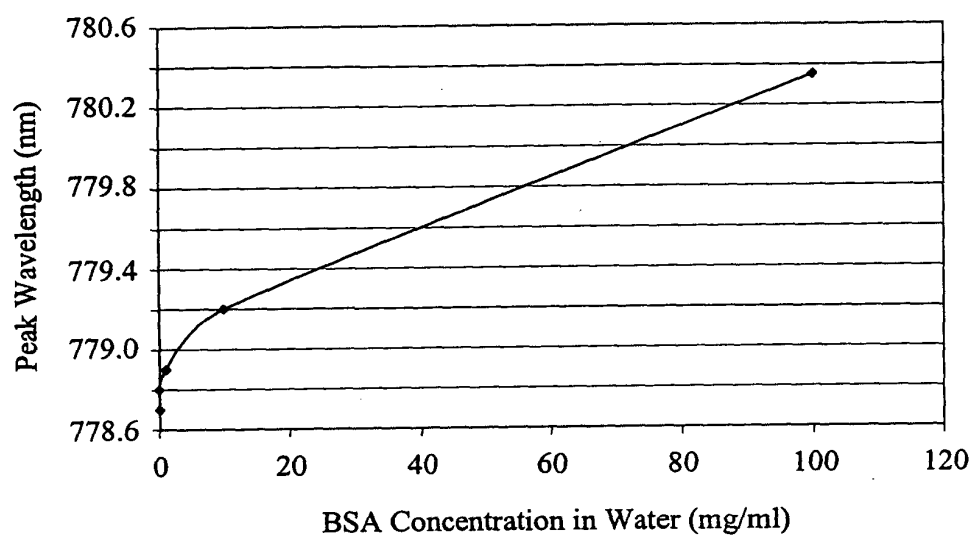


Figure 35

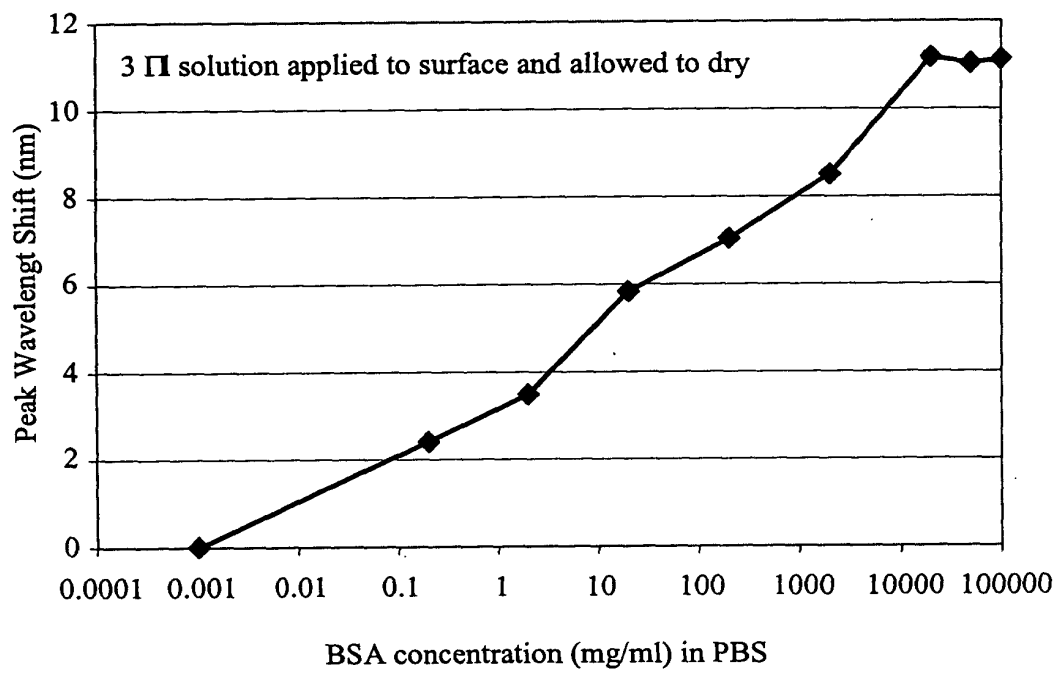


Figure 36

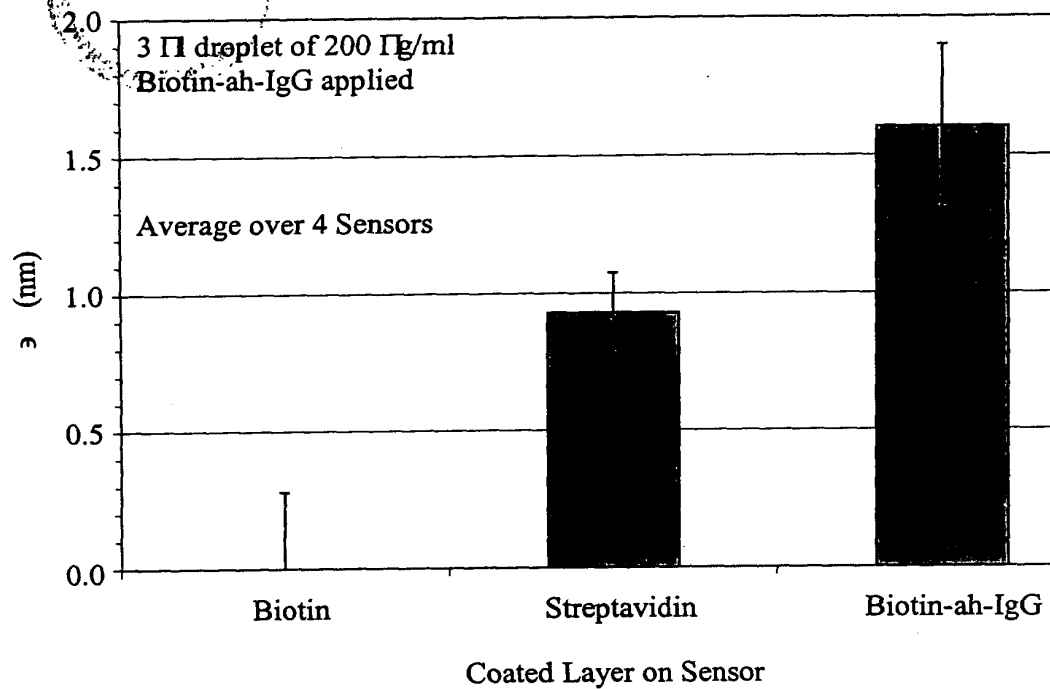


Figure 37A

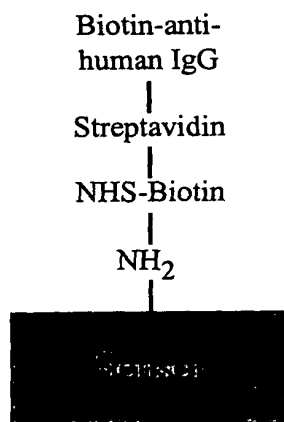


Figure 37B

38/52

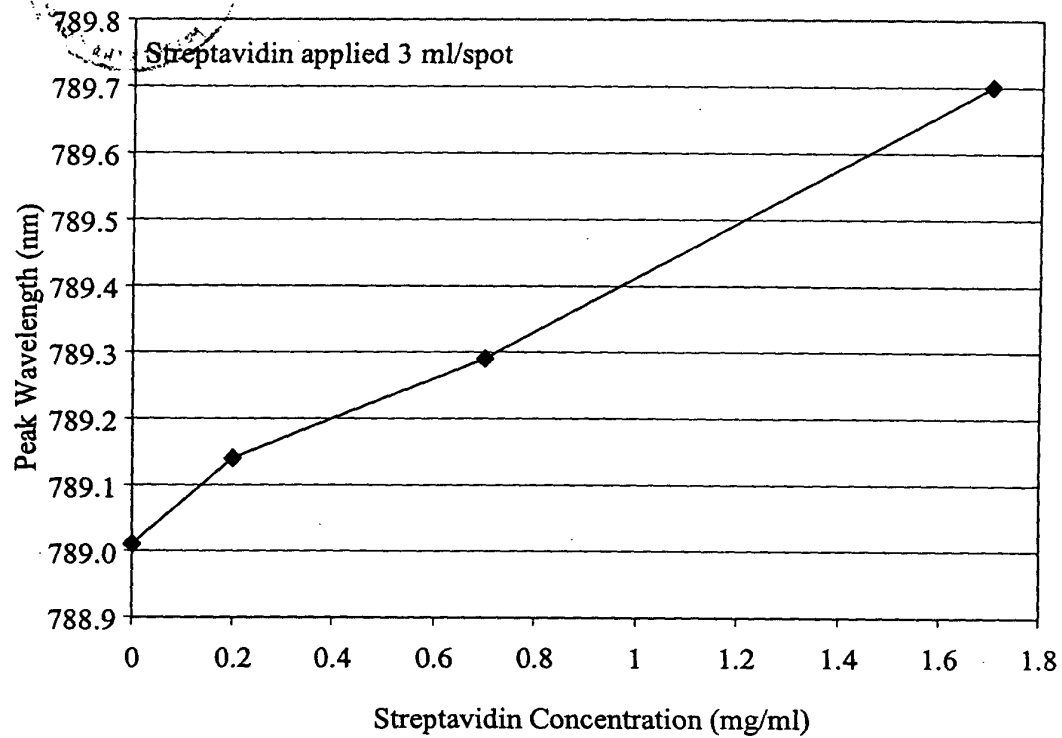


Figure 38A

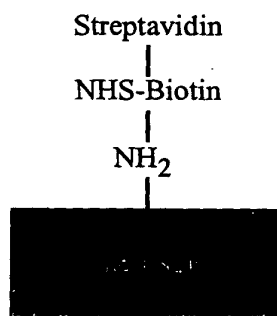


Figure 38B

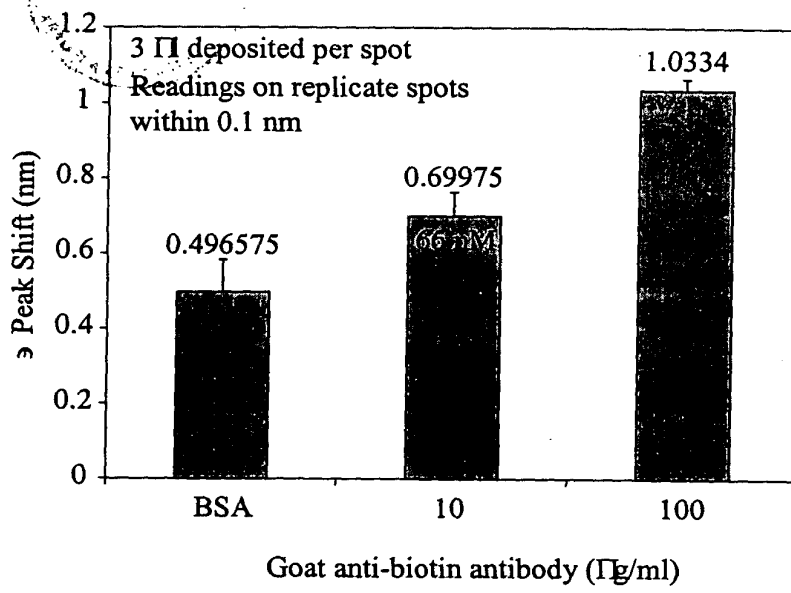


Figure 39A

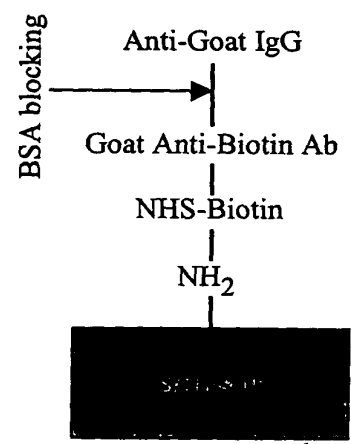


Figure 39B

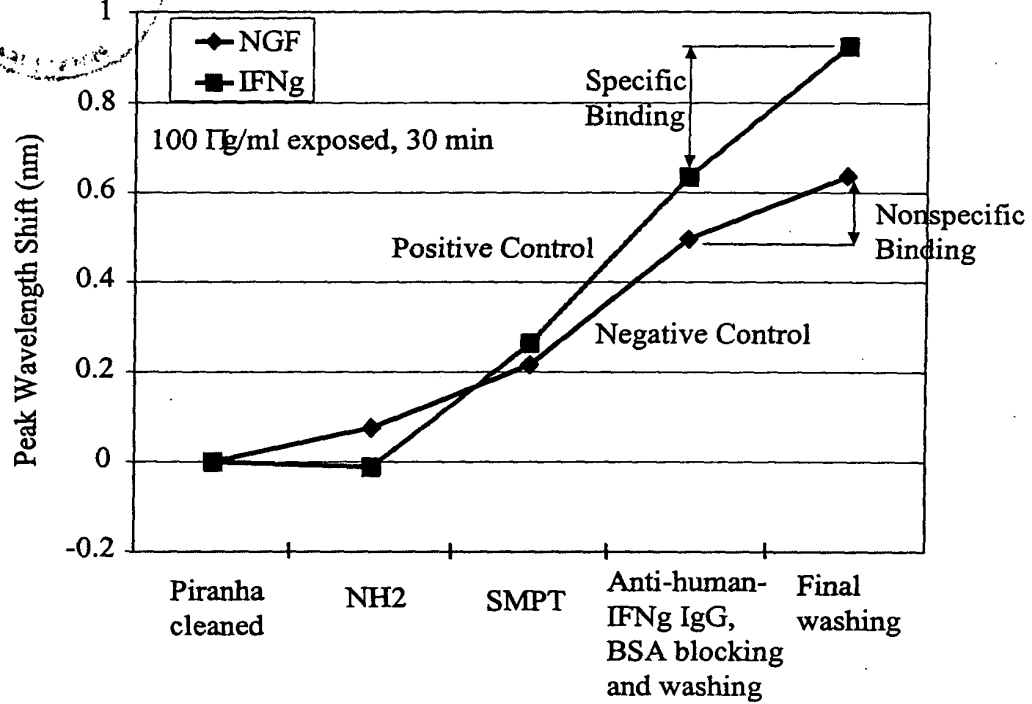


Figure 40A

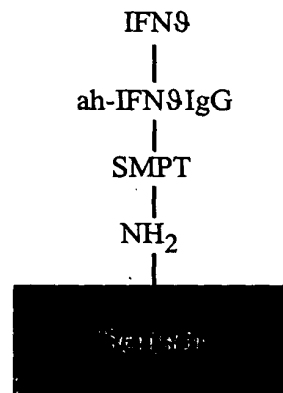


Figure 40B



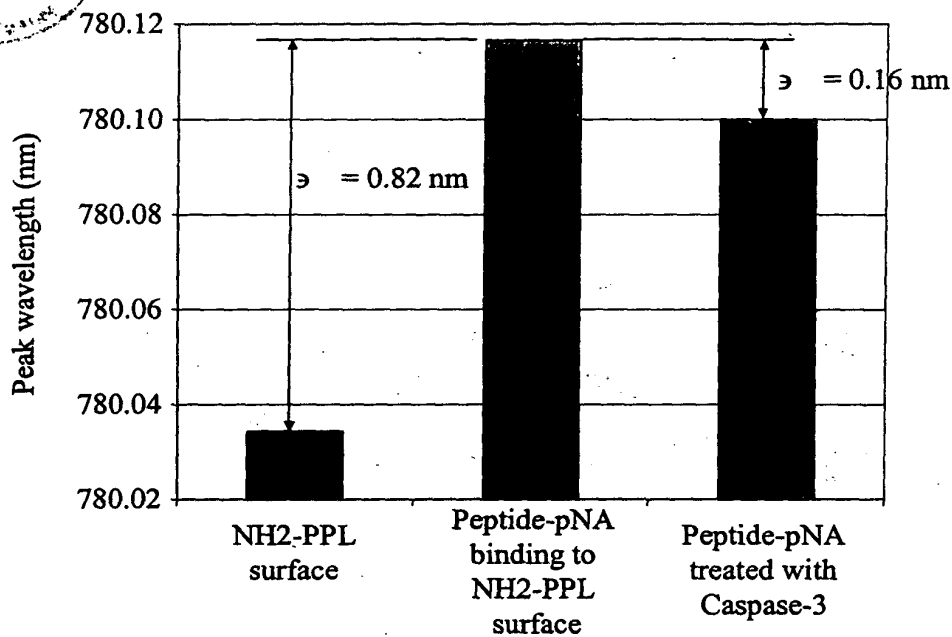


Figure 41A

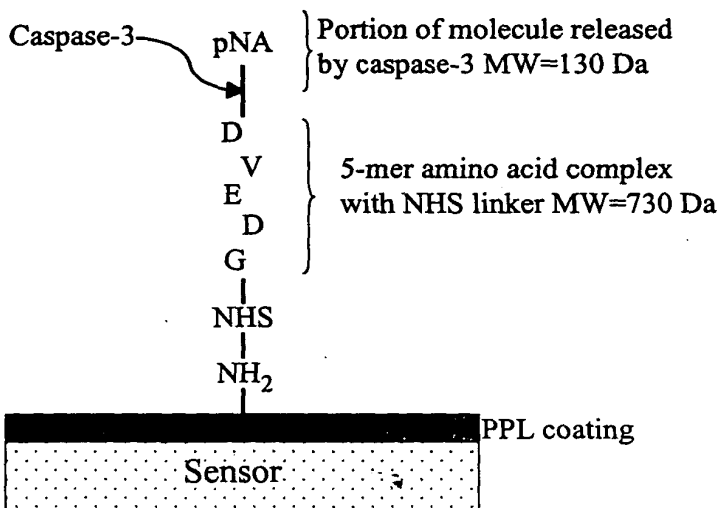


Figure 41B

Measured shifting of the resonant wavelength caused by the binding of various biomolecular layers.

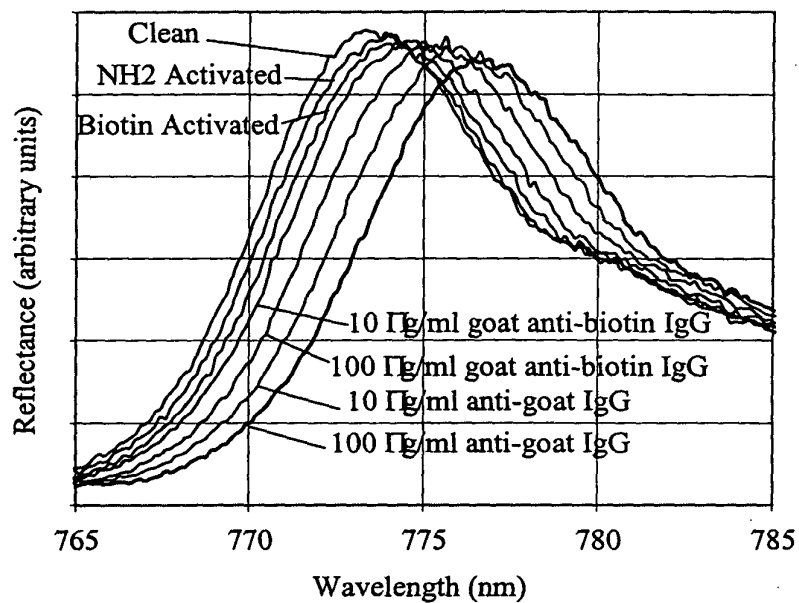


Figure 42A

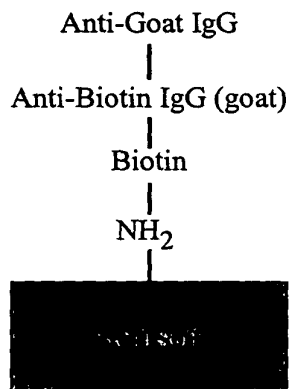


Figure 42B

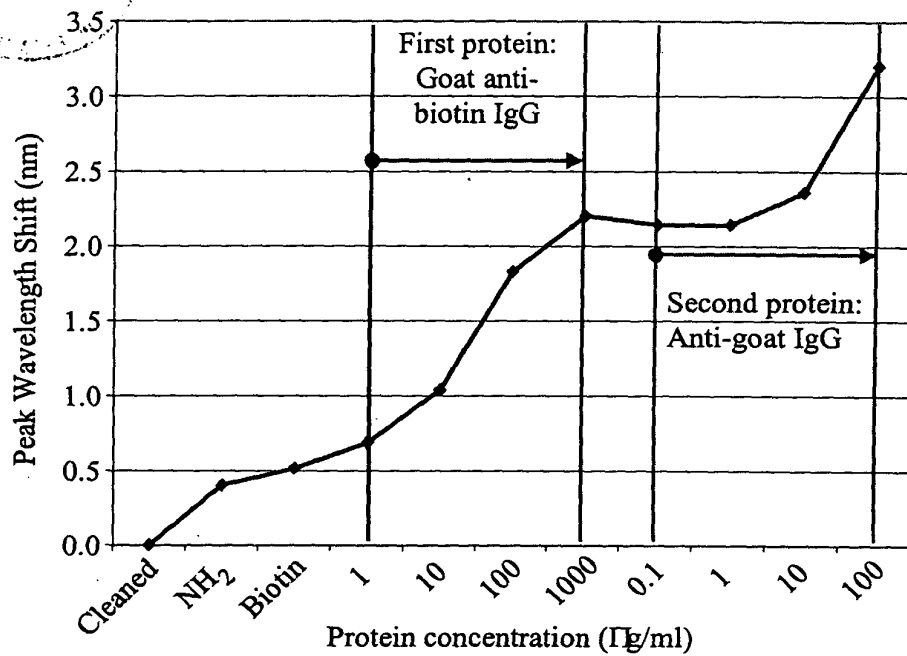


Figure 43A

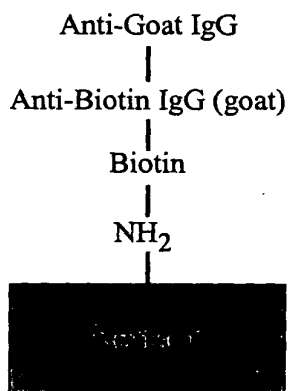


Figure 43B

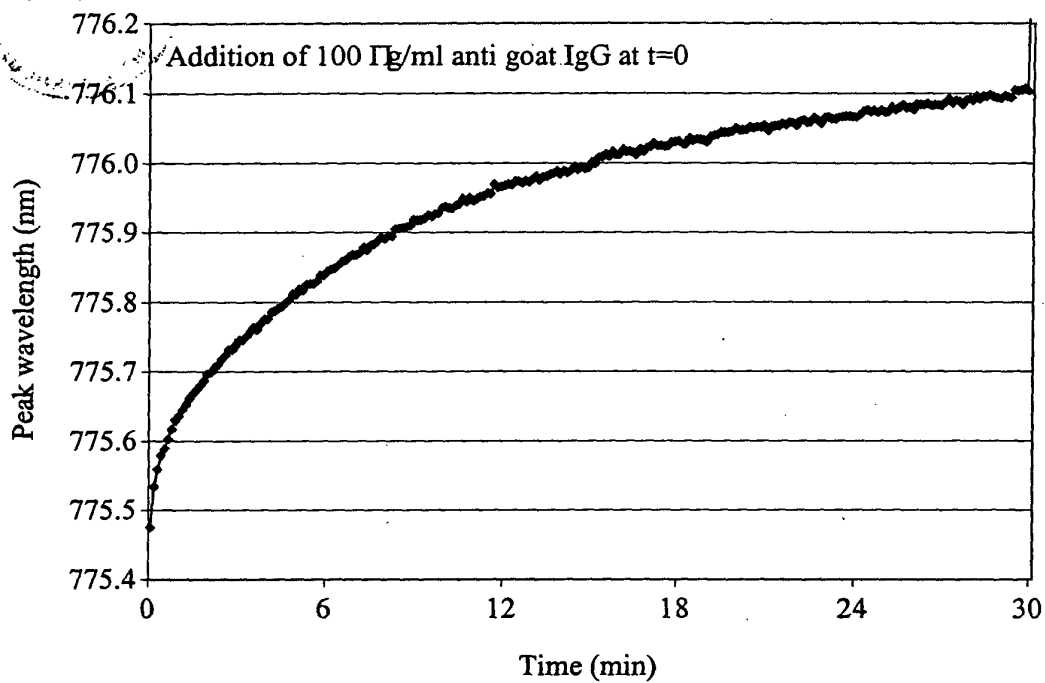


Figure 44A

Anti-Goat IgG  
|  
Anti-Biotin IgG  
(goat)  
|  
Biotin  
|  
NH<sub>2</sub>

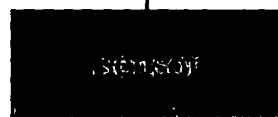


Figure 44B

45/52

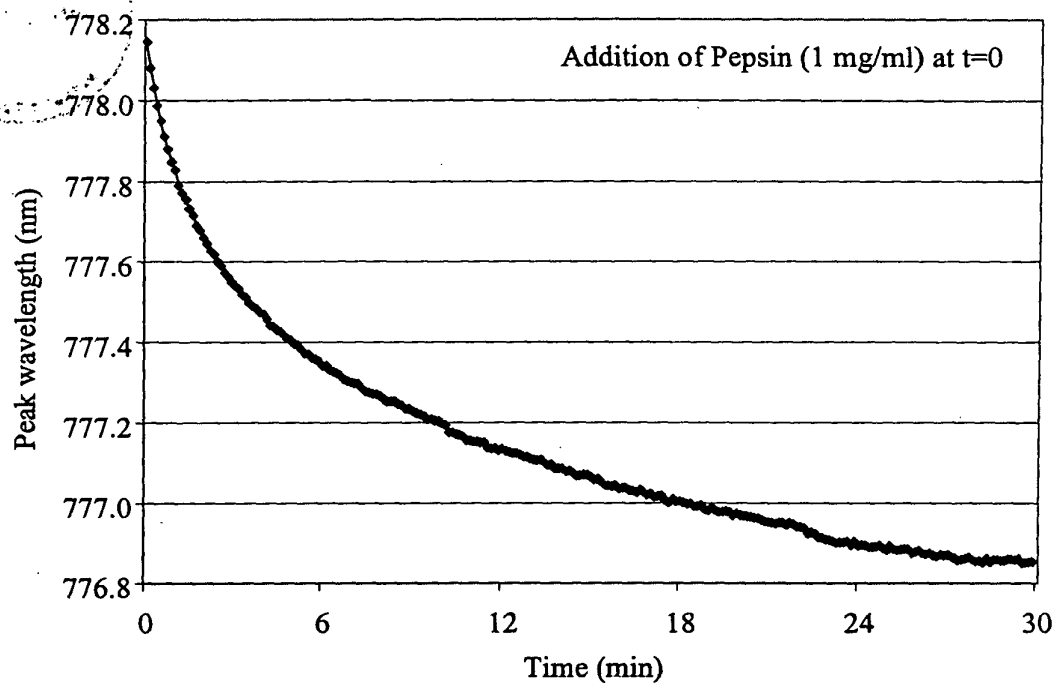


Figure 45A

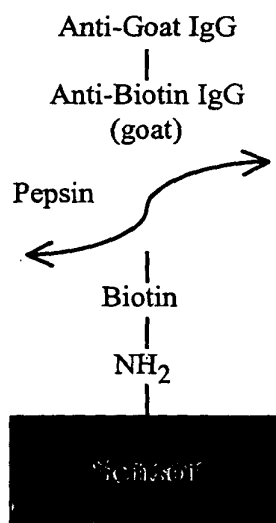


Figure 45B



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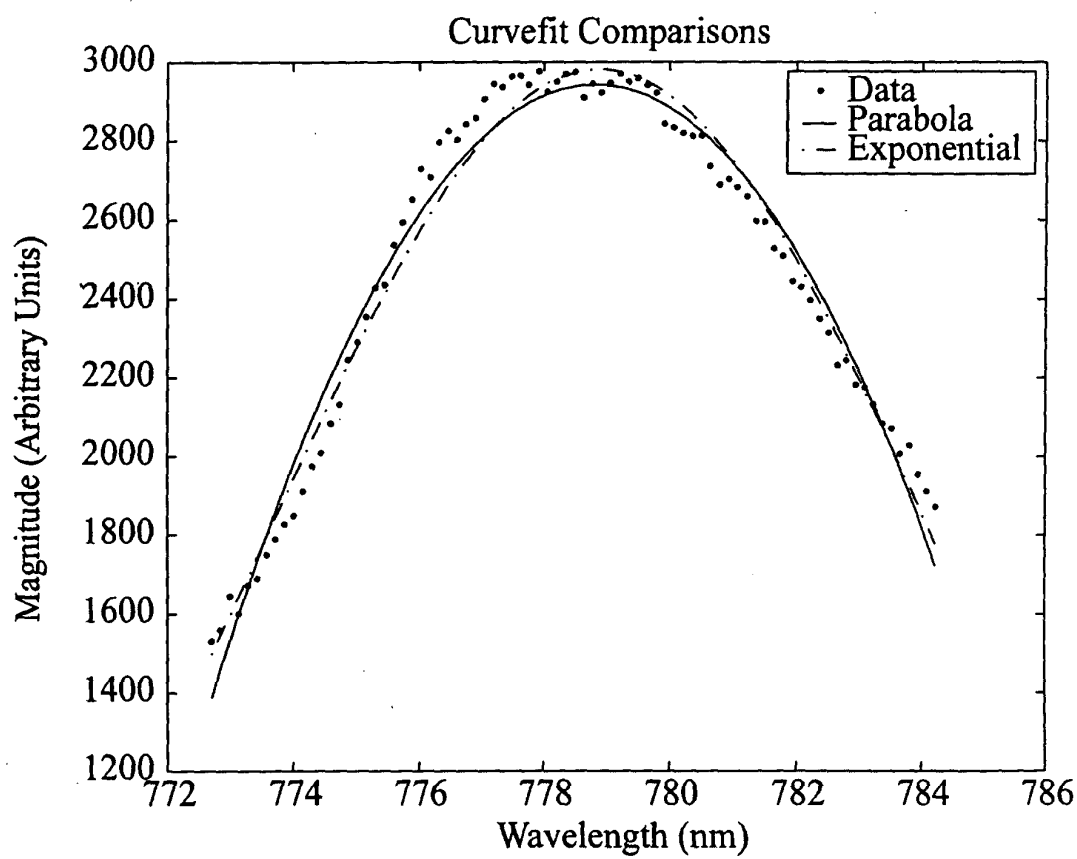


Figure 46

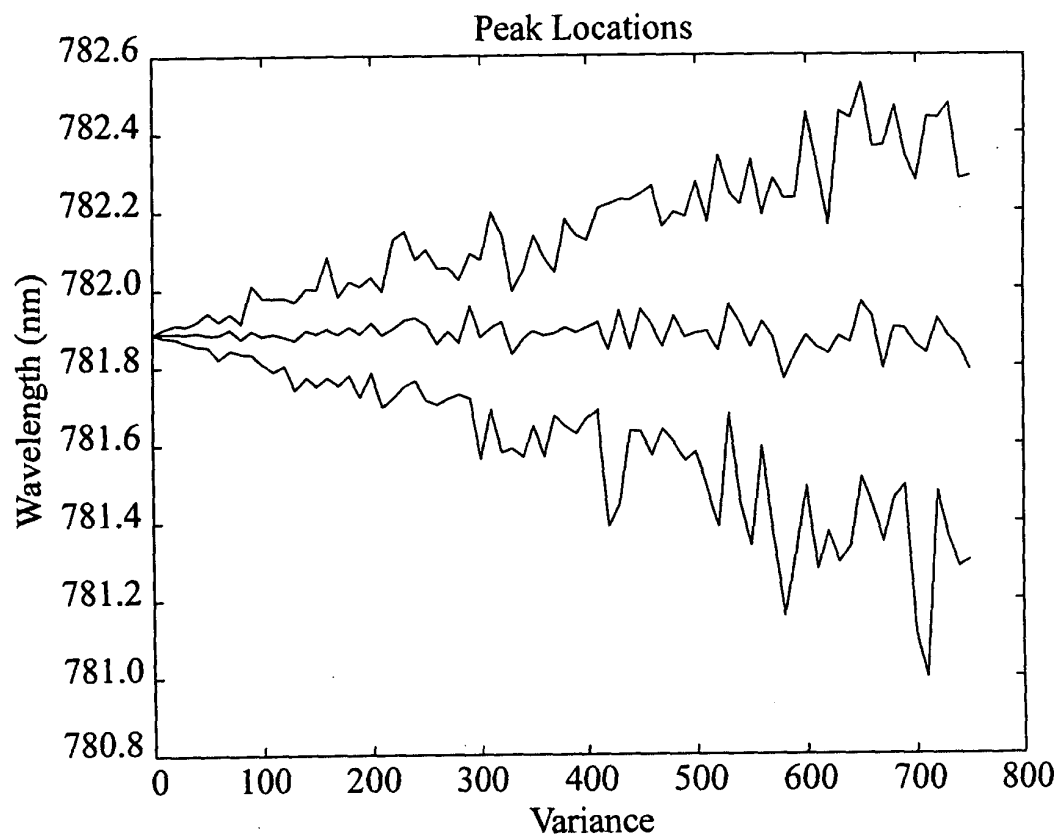
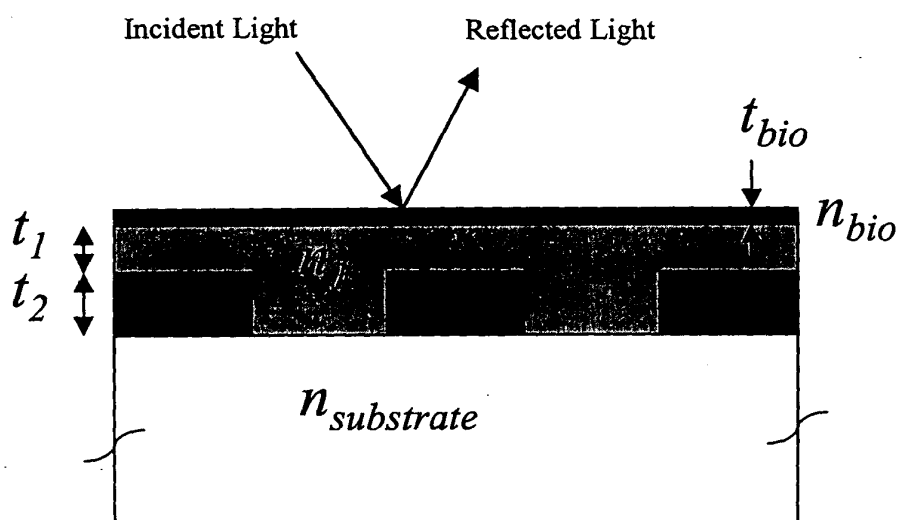


Figure 47



Material 1 = Electrical Insulator (photoresist, epoxy, glass)

Material 2 = Indium tin oxide conductor

Substrate = Glass

Figure 48





## Concentric Circle Design

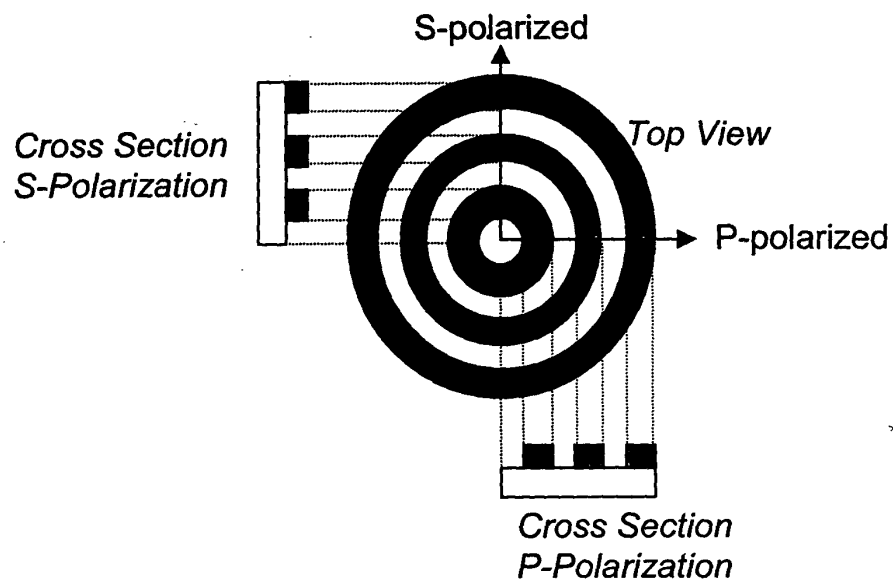


Figure 49

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## Hexagonal Grid Design

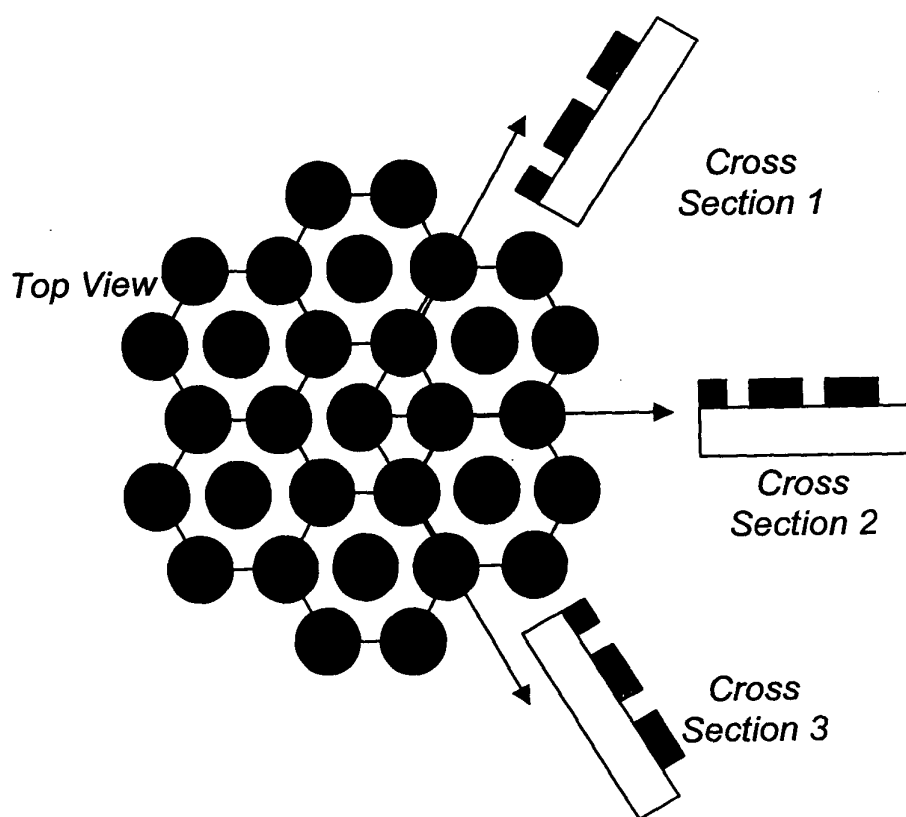


Figure 50

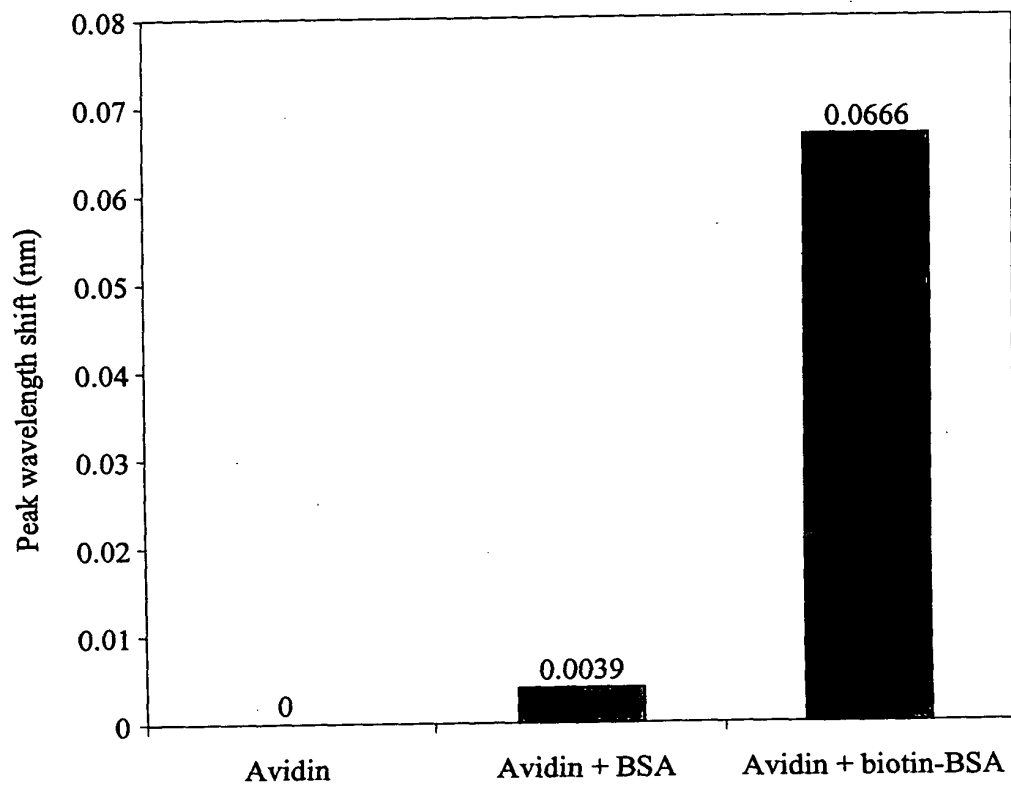


Figure 51

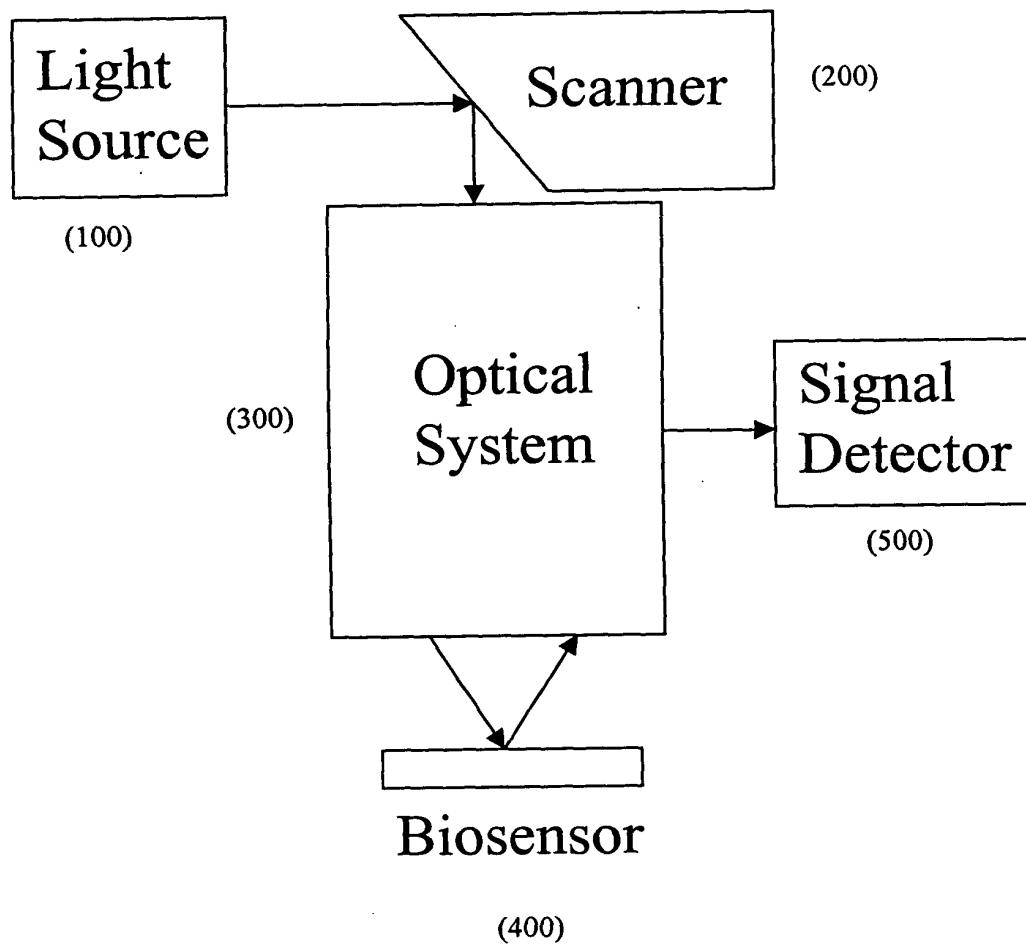


Figure 52

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